

# EXHIBIT

## A

## Curriculum Vitae

George Kesidis

### Personal:

#### *Employment History:*

Associate Professor in both Electrical Engineering and Computer Science & Engineering Departments, faculty member of the intercollege Operations Research graduate program, Pennsylvania State University, April 2000 - present.

Part-Time Member of Technical Staff (systems engineering) of Mahi Networks Inc., Petaluma, CA, Feb. 2001-Oct. 2001.

Associate Professor of Electrical and Computer Engineering, University of Waterloo: Aug 1998 - April 2000.

Assistant Professor of Electrical and Computer Engineering, University of Waterloo: June 1992 - Aug 1998.

#### *Work Address:*

CSE Dept, 338J IST Building, University Park, PA, 16802, USA

Office Phone: (814)865-9190

Email: kesidis@cse.psu.edu

URL: <http://www.cse.psu.edu/~kesidis>

#### *Professional Affiliation:*

Senior member of the IEEE

Adjunct Professor of Electrical Engineering, Ryerson Polytechnic University, Toronto, Canada

#### *Research Interests:*

Communication/Computer Networking, Performance Evaluation, Optimisation, Simulation, Scheduling, Routing, Medium Access Control, Traffic Engineering, Security.

#### *Degrees:*

Ph.D. from the University of California at Berkeley in EECS supervised by Jean Walrand (1992).

M.S. from the University of California at Berkeley in EECS supervised by Eugene Wong (1990).

B.A.Sc. from the University of Waterloo in Electrical Engineering (1988).

#### *Awards and Scholarships:*

CITR (Canadian Institute for Telecommunications Research) 1996 Best Proposal Award (co-investigator)

T.L. Lim Predoctoral Prize in EECS (1989, U.C. Berkeley)

NSERC Canada 1967 scholarship for graduate studies abroad (1988-1992)

Sir Sanford Fleming Medal of Academic Excellence (1988, UW)

APEO Medal of Academic Achievement (1988, UW)

John H. Chapman Award in Communications Engineering (1987, Spar Aerospace)

Col. H. Heasley Engineering Entrance Scholarship (1988, UW)

**PUBLICATIONS:**

Selections from the following are available at: <http://www.ee.psu.edu/faculty/kesidis/kesidis1.html>

Note: A "\*" indicates a graduate student under my supervision.

**Books:**

G. Kesidis. An Introduction to Modeling and Performance Evaluation of Communication Networks. Wiley, in preparation.

G. Kesidis. ATM Network Performance. Kluwer Academic Publishers, Boston, Second Edition, Dec. 1998 (200 pages)

**Journal Papers:**

1. Y. Jin\* and G. Kesidis, "Dynamics of usage-priced communication networks: the case of a single bottleneck resource," *IEEE Transactions on Networking (ToN)*, Oct. 2003.
2. R. Rao\* and G. Kesidis, "Mobility management of ad-hoc sensor networks using a distributed annealing strategy," *IEEE Transactions on Mobile Computing*, 2004.
3. H. Zhu, G. Cao, G. Kesidis and C. Das, "An adaptive power-conserving service discipline for Bluetooth (APCB) Wireless Networks", *Computer Communications*, 2004.
4. S. Jivawar\* and G. Kesidis, "Performance analysis of a class of Shaped Deficit Round-Robin (SDRR) schedulers," *Journal of Telecommunication Systems special issue on Recent Advances in Communication and Internet Technology*, 2003.
5. R. Rao\* and G. Kesidis, "Detection of malicious packet dropping using statistically regular traffic patterns in multihop wireless networks that are not bandwidth limited", *Brazilian Journal of Telecommunications (Revista Brasileira de Telecomunicacoes)*, Vol. 18, No. 2, Oct. 2003.
6. Y. Jin\* and G. Kesidis, "Equilibria of a noncooperative game for heterogeneous users of an ALOHA network", *IEEE Comm. Letters*, Vol. 6, No. 7, pp. 282-284, 2002.
7. G. Kesidis, K. Chakrabarty and L. Tassiulas, "Traffic Shaping for a Loss System", *IEEE Communication Letters*, Dec. 2000, pp. 417-419.
8. G. Kesidis and T. Konstantopoulos, "Extremal Shape-controlled traffic patterns in high-speed networks", *IEEE Trans. Comm.*, Vol. 48, No. 5, May 2000, pp. 813-819.
9. G. Kesidis and T. Konstantopoulos, "Worst-case performance of a buffer with independent shaped arrival processes", *IEEE Communication Letters*, Vol. 4, No. 1, Jan. 2000, pp. 26-28.
10. A. Hung\*, M.-J. Montpetit and G. Kesidis, "ATM via Satellite: A Framework and Implementation," *AOM Wireless Networks (special issue on Hybrid and Satellite Communication Networks)*, Vol. 4, No. 2, Feb. 1998, pp. 141-154.
11. A. Hung\* and G. Kesidis, "Bandwidth Scheduling for Wide-Area ATM Networks using Virtual Finishing Times", *IEEE/AOM Trans. Networking*, Vol. 4, No. 1, Feb. 1998, pp. 49-54.
12. G. de Veciana and G. Kesidis, "Bandwidth Allocation for Multiple Qualities of Service using Generalized Processor Sharing", *IEEE Trans. on Info. Theory*, Vol. 42, No. 1, Jan. 1996, pp. 268-271.
13. G. de Veciana, G. Kesidis, and J. Walrand, "Resource Management in Wide-Area ATM Networks Using Effective Bandwidths", *IEEE JSAC*, Vol. 13, No. 6, Aug. 1995, pp. 1081-1090.
14. O. Courcoubetis, G. Kesidis, A. Ridder, J. Walrand, and R. Weber, "Admission Control and Routing in ATM Networks using Inferences from Measured Buffer Occupancy", *IEEE Trans. Comm.*, Vol. 43, No. 2/3/4, pp. 1778-1784, April 1995.

15. G. Kesidis, "Analog Optimization with Wong's Stochastic Neural Network", *IEEE Trans. Neural Networks*, Vol. 6, No. 1, pp. 258-260, Jan. 1995.
16. G. Kesidis and J. Walrand, "Conservation Relations for Fully Shared ATM Buffers", *Probability in the Engineering and Informational Sciences*, Vol. 8, pp. 147-151, 1994.
17. G. Kesidis, J. Walrand, and C.-S. Chang, "Effective Bandwidths for Multiclass Markov Fluids and other ATM Sources", *IEEE/ACM Transactions on Networking*, Vol. 1, No. 4, pp. 424-428, Aug. 1993.
18. G. Kesidis and J. Walrand, "Quick Simulation of ATM Buffers with On-off Markov Fluid Sources," *ACM TOMACS*, Vol. 3, No. 3, pp. 269-276, July 1993.
19. G. Kesidis and J. Walrand, "Relative Entropy Between Markov Transition Rate Matrices", *IEEE Trans. on Info. Theory*, Vol 39, No. 3, pp. 1056,1057, May 1993.
20. G. Kesidis and E. Wong, "Optimal Acceptance Probability for Simulated Annealing," *Stochastics and Stochastics Reports*, Vol. 29, pp. 221-226, 1990.

*Conference Papers:*

1. P. Jeon\* and G. Kesidis, "Robust multipath and multipriority routing in MANETs using both energy and delay metrics", *ACM International Workshop on Performance Evaluation of Wireless Ad Hoc, Sensor, and Ubiquitous Networks (PE-WASUN)*, Montreal, Oct. 2005.
2. S. Jiyasurat\*, G. Kesidis and D. Miller, "Hierarchical Shaped Deficit Round-Robin (HSDRR) Scheduling", in *Proc. IEEE GLOBECOM*, St. Louis, Dec. 2005.
3. P.B. Jeon\* and G. Kesidis, "Avoiding malicious packet dropping in ad hoc networks using multipath routing", *Proc. 43rd Allerton Conference on Communications, Control and Computing*, Oct. 2005.
4. L. Li\*, S. Jiyasurat\*, P. Liu and G. Kesidis, "Emulation of single-packet UDP scanning worms in large enterprises", in *Proc. International Teletraffic Congress (ITC-19)*, Beijing, Aug. 2005.
5. I. Hamadeh\*, J. Hart\*, G. Kesidis, V. Pothamsetty, "A Preliminary Simulation of the Effect of Scanning Worm Activity on Multicast", in *Proc. IEEE Parallel and Distributed Simulation (PADS)*, Symposium on Measurement, Modelling, and Simulation of Malware track, Monterey, CA, June 1-3, 2005.
6. G. Kesidis, I. Hamadeh\* and S. Jiyasurat\*, "Modeling randomly scanning and bandwidth-saturating worms in the Internet," *3rd IEEE QoS-IP Conference*, Catania, Sicily, Feb. 2005.
7. Y. Jin\* and G. Kesidis, "TCP window flow control in a priced network", *IASTED Conference on Communications, Internet and Information Technology (CIIT 2004)*, St. Thomas, Nov. 2004.
8. X. Deng\*, S. Yi\*, C. Das and G. Kesidis, "RL-RED: A Flow Control Mechanism for 802.11-Based Wireless Ad Hoc Networks", *IASTED Conference on Communications, Internet and Information Technology (CIIT 2004)*, St. Thomas, Nov. 2004.
9. N. Weaver, I. Hamadeh\*, V. Paxson and G. Kesidis, "Preliminary results using scale-down to explore worm dynamics", in *Proc. ACM WORM*, Oct. 2004.
10. S. Yi\*, M. Keppes, S. Garg, X. Deng\*, G. Kesidis, C. Das, "Proxy-RED: An AQM scheme for wireless LANs", in *Proc. ICCCN*, Chicago, Oct. 2004.
11. X. Ji, H. Zha, J.J. Metzner and G. Kesidis, "Dynamic cluster structure for entity detection and tracking in wireless ad-hoc sensor networks," in *Proc. IEEE ICC*, Paris, June 2004.
12. I. Hamadeh\*, Y. Jin\*, S. Wallis\*, G. Kesidis and C. Kirjner, "Pricing and security issues for residential broadband access" (invited), in *Proc. CISS*, Princeton, March 2004.

13. S. Jiwassurat\* and G. Kesidis, "Performance of shaped deficit round-robin (SDRR) scheduling with declared output jitter bounds per flow" (invited), in Proc. 41st Allerton Conference on Communications, Control and Computing, Oct. 2003.
14. S. Yi\*, X. Deng\*, G. Kesidis and C. Das, "HaTCH: A Two-level Caching Scheme for Estimating the Number of Active Flows", in Proc. IEEE CDC, Maui, Dec. 2003.
15. X. Deng\*, S. Yi\*, G. Kesidis and C. Das, "A Control Theoretic Approach for Designing Adaptive AQM Schemes," in Proc. IEEE GLOBECOM, San Francisco, Dec. 2003 (short version).
16. R. Rao\* and G. Kesidis, "Detection of malicious packet dropping using statistically regular traffic patterns in multihop wireless networks that are not bandwidth limited", in Proc. IEEE GLOBECOM, San Francisco, Dec. 2003 (shorter version).
17. G. Kesidis, T. Konstantopoulos and S. Phoha, "Surveillance coverage and communication connectivity properties of ad hoc sensor networks under a random mobility strategy," in Proc. IEEE Sensors, Toronto, Oct. 2003.
18. W. Zhang, G. Cao and G. Kesidis, "Secure routing in ad hoc networks and a related intrusion detection problem," in Proc. MILCOM, Boston, Oct. 2003.
19. I. Hamadah\* and G. Kesidis, "Performance of IP Address Fragmentation Strategies for DDoS Traceback," in Proc. IEEE Workshop on IP Operations and Management (IPOM), Kansas City, Oct. 1-3, 2003.
20. X. Deng\*, S. Yi\*, G. Kesidis and C. Das, "Class-Based Stabilized Virtual Buffer - An AQM Scheme with Stability, Fairness and QoS Assurance", International Teletraffic Congress 18 (ITC-18), Berlin, August 2003.
21. I. Hamadah\* and G. Kesidis, "Packet marking for traceback of illegal content distribution", in Proc. International Conference on Cross-Media Service Delivery (CMSD), ISBN 1-4020-7480-8, Santorini, Greece, 2003.
22. Y. Jin\* and G. Kesidis, "Nash equilibria of a generic networking game with applications to circuit-switched networks," in Proc. IEEE INFOCOM, San Francisco, March 2003.
23. G. Kesidis and Y. Jin\*, "Feasible pricing of differentiated services for the emerging Internet" (invited), Proc. 40th Allerton Conference on Communications, Control and Computing, Oct. 2002.
24. B. Ninan, G. Kesidis and M. Devetsikiotis, "A simulation study of non-cooperative pricing strategies for circuit-switched optical networks", ACM/IEEE MASCOTS, Dallas, 2002.
25. X. Deng\*, S. Yi\*, G. Kesidis and C. Das, "Stabilized Virtual Buffer (SVB) - An Active Queue Management Scheme for Internet Quality-of-Service", Proc. IEEE GLOBECOM, Taipei, Taiwan, Nov. 2002.
26. S. Yi\*, X. Deng\*, G. Kesidis and C. Das, "Providing Fairness in the Diffserv Architecture", Proc. IEEE GLOBECOM, Taipei, Taiwan, Nov. 2002.
27. V. Bhatnagar\* and G. Kesidis, "Bluetooth Scatternet Formation," Proc. Joint 2nd IEEE International Conference on Networking and IEEE International Conference on Wireless LANs and Home Networks (ICN'02 and ICWLHN 2002), Atlanta, 26-29 August, 2002.
28. Y. Jin\* and G. Kesidis, "A pricing strategy for an ALOHA network of heterogeneous users with inelastic bandwidth requirements", in Proc. CUS8, Princeton, March 2002.
29. R. Rao\*, O. Baux and G. Kesidis, "Demand-based Bluetooth scheduling", 3rd IEEE Wireless LAN (WLAN) Conference, Boston, MA, Sept. 2001, URL: <http://www.wlan01.wpi.edu/proceedings/index2.html>
30. N. Milidrag\*, G. Kesidis and M. Devetsikiotis, "Fluid simulation of large packet-switched networks", in Proc. SPIE ITCOM, Denver, Aug. 2001.
31. G. Kesidis, "Scalable resources management using Shaped Weighted Round-Robin Scheduling", in Proc. SPIE ITCOM, Denver, Aug. 2001.

32. G. Kesidis and L. Tassiulas, "General connection blocking bounds and an implication of billing for provisioned label-switched routes in an MPLS Internet cloud", In Proc. International Conference on Networking (ICON'01), Colmar, France, July 2001.
33. D. Fayek\*, G. Kesidis and A. Vannelli, "Hierarchical virtual paths allocation in large-scale ATM networks using noncooperative game models", in Proc. Canadian Conference on Broadband Research (CCBR), Oct. 1999.
34. G. Kesidis, "Bandwidth adjustments using on-line packet-level measurements", in Proc. SPIE Conference on Performance and Control of Network Systems, Boston, Sept. 19-22, 1999.
35. G. Kesidis and T. Konstantopoulos, "Shape-controlled traffic patterns that maximize overflow probabilities in high-speed networks", Proc. IEEE CDC, Tampa, Dec. 1998.
36. A. Hung\*, G. Kesidis and N. McKeown, "ATM Input-Buffered Switches with the Guaranteed-Rate Property", Proc. IEEE ISCC'98, Athens, June 1998.
37. A. Hung\* and G. Kesidis, "Performance Evaluation of Multilevel-Assignment Hierarchical Round-Robin Bandwidth Scheduling for ATM," Proc. ITC'97, Washington, DC, pp. 1247-1256, June 1997.
38. G. Kesidis and N. McKeown, "Output-Buffer ATM Packet Switching for Integrated-Services Communication Networks," Proc. IEEE ICC'97, Montreal, June 1997.
39. A. Hung\*, M.-J. Montpetit, G. Kesidis and P. Takats, "A Framework for ATM via Satellite," Proc. IEEE GLOBECOM, London, UK, Nov. 1996.
40. G. Kesidis, A. Singh, D. Cheung\*, and W. Kwok\*, "Feasibility of Fluid Event-Driven Simulation for ATM Networks", Proc. IEEE GLOBECOM, London, UK, Nov. 1996.
41. G. de Veciana and G. Kesidis, "An Approach to Provisioning for Real-time VBR Video Teleconferencing via End-to-end Virtual Path Connections", Proc. IEEE ICC'96, Dallas, TX, June 1996, pp. 632-636.
42. A. Hung\* and G. Kesidis, "End-to-end Delay Bounds and Buffer Sizing in ATM Networks with Applications to Video Transmission", Proc. First Workshop on ATM Traffic Management, Paris, pp. 157-164, Dec. 1995.
43. G. Kesidis and A. Singh, "An Overview of a Cell-Level ATM Network Simulator", High Performance Computing Systems Conf., Montreal, Canada, June 1995.
44. G. Kesidis, T. Konstantopoulos, and M. Zazanis, "Sensitivity Analysis of Discrete-Time Randomized Service Priority Queues", Proc. 33rd IEEE CDC, Orlando, FL, pp. 2627-2630, Dec. 1994.
45. G. Kesidis and J. Walrand, "Large deviations of traffic in high-speed digital networks with a view towards network control", Proc. 29th Allerton Conference on Communications, Control and Computing, p. 581-590, Oct. 1991.

*Submitted journal papers under review:*

1. Sungwon Yi, Martin Kappes, Sachin Garg, Xidong Deng, George Kesidis, and Chita R. Das, "Proxy-RED: An AQM Scheme for Wireless Local Area Networks", submitted to WONC, Sept 05, 12 journal pages.
2. X. Deng\*, S. Yi\*, G. Kesidis and C. Das, "A generalized control theoretic approach for designing adaptive AQM schemes," submitted to IEEE TnN, 12 journal pages.  
under second round of reviews
3. J. Wang\*, D.J. Miller, and G. Kesidis, "Efficient Mining of the Multidimensional Traffic Cluster Hierarchy for Digesting, Visualization, and Modeling," submitted to IEEE JSAC, Aug 05, 25 manuscript pages.
4. Y. Jin\* and G. Kesidis, "Charge sensitive and incentive compatible end-to-end window-based control for selfish users", submitted to IEEE JSAC, Feb 05, 9 journal pages.

5. B. Ninan, M. Devetsikiotis and G. Kesidis, "Resource Sharing Dynamics in Connection-Oriented Networks", submitted to the Journal of Telecommunication Systems, Fall '04, 20 manuscript pages.
6. G. Kesidis, I. Hamadeh\*, Y. Jin\* and S. Jivassurat\*, "Modeling randomly scanning and bandwidth-saturating Internet worms," submitted to ACM TOMACS, Dec 04, 18 manuscript pages.

*Submitted conference papers under review:*

1. Y. Jin\* and G. Kesidis, "Distributed Contention Window Control for selfish users in IEEE 802.11 Wireless LANs", 8 journal pages.
2. B. Mortazavi\* and G. Kesidis, "A model of a reputation system for incentive engineering," 9 journal pages.

*Invited Talks Off Campus:*

1. "Internet Worm Modeling," CS Dept, Carleton University, Canada, Oct. 2005.
2. DHS PREDICT Workshop, 9/23/05, Panel on Anonymization of Internet Trace Data for Attack/Defense Experimentation
3. "Evaluation Methodology for Internet Security Testing", 2nd US-Japan Experts Workshop on Critical Information Infrastructure Protection (CIIP), Tokyo, June 2005.
4. "Cross-layer issues in Wireless networking," IFIP Networking'05 panel, Waterloo, Ontario, May 5, 2005.
5. "Modeling of bandwidth-saturating scanning-worms in the Internet," IFIP Workshop on Mathematical Modelling and Analysis of Computer Networks, Waterloo, Ontario, May 6, 2005.
6. "Multipriority and multipath routing in ad hoc networks," Center for Wireless Networking, ECE Dept, U.T. Austin, Dec. 2, 2004.
7. "Overview of the NSF/DHS cyber security testbed and testing methodologies project", CS Dept, Univ. of Toronto, Aug. 23, 2004.
8. "Purposeful mobility in sensor MANETs", Stochastic Networks Conference (SNC), Montreal, July 2004.
9. "Internet forensics," Brooklyn Poly., Jan. 2003.
10. Cisco Systems Ltd Internal Security Summit, San Jose, CA, Nov. 17,18, 2003.
11. "Internet Forensics and Pricing," UC Davis Seminar, Nov. 16, 2003.
12. "Pricing and Billing for the Emerging Internet," ESE Dept, University of Pennsylvania, Oct. 27, 2003.
13. "Pricing differentiated services," ECE Dept, Purdue University, Feb. 2003.
14. "Bluetooth Scheduling and Scatternet Formation", EE Dept, Caltech, May 9, 2001.
15. "Bluetooth Scatternet Formation", CS Dept, Univ. Toronto, Sept. 28, 2001.

*Patents, book chapters, editorials and other publications:*

1. G. Cao, G. Kesidis, T. La Porta, B. Yao and S. Phoha, "Purposeful mobility in tactical sensor networks," in Sensor Networks, edited by C. Griffin, T. La Porta and S. Phoha, IEEE Press, 2004.
2. R. Baxjey et al., "Cyber Defense Technology Networking and Evaluation," *Communications of the ACM* special issue on Homeland Security, March 2004.
3. I. Hamadeh\* and G. Kesidis, "Real-time packet traceback and associated packet marking strategies", US patent pending; see news articles on "e-postmarks".

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4. Report of NSF workshop on fundamental research in networking, workshop held at Airlie VA, April 2003 (co-author).
  5. G. Kesidis and T. Konstantopoulos, "Extremal Traffic and Worst-Case Performance for Queues with Shaped Arrivals", in *Analysis of Communication Networks: Call Centres, Traffic and Performance*, edited by D.R. McDonald and S.R.E. Turner, Fields Institute Communications/American Mathematical Society (AMS), 2000, ISBN 0-8218-1991-7.
  6. M.-J. Montpetit and G. Kesidis, "Broadband via Satellite", guest editorial, *IEEE Communications Magazine*, vol. 35, no. 7, July 1997, p. 28.
  7. G. Kesidis, M. Aissoui and H. Pezeshki-Esfahani, "ATM Solutions for Stored and Real-Time MPEG-2 Video", ATM Forum report no. ATMF 97-0412, May 1997 (submitted via Newbridge Networks Corp.).
  8. J. Walrand and G. Kesidis, review of book "Large Deviations Techniques in Decision, Simulation, and Estimation" by J.A. Bucklew, *IEEE Info. Th. Trans.*, pp. 1493,1494, Sept. 1991.



**GRANTS AND CONTRACTS:**

2005-2008 NSF Cyber Trust: Protecting TCP Congestion Control: Tools for Design, Analysis and Emulation  
G. Kesidis (PSU PI and overall PI), C. Das (co-PI), in collaboration with Purdue  
PSU funding \$350k over 3 years, total funding \$660k

2005-2008 NSF NeTS-NOSS Controllable node mobility for Mission Oriented Sensor Networks  
G. Cao (PI), T. La Porta (co-PI), G. Kesidis (co-PI)  
Funding \$450k

2004-2005 Morris, Nichols, Arsht & Tunnell, Attorneys at Law, Wilmington, DE.  
I was retained as an expert witness by this law firm for a patent dispute involving MPLS technology.

2005-2006 NSF DUE: Undergraduate education in cyber security  
P. Liu (PI), C. Chu, J. Bagby, D. Lee (co-PIs), T. La Porta, G. Cao and G. Kesidis (senior personnel)  
Total PSU funding: \$296,466

2003-2006 DHS/NSF Cyber Trust: Testing and benchmarking methodologies for future network security mechanisms (EMIST), <http://emist.lti.psu.edu>  
G. Kesidis (PSU PI and overall EMIST PI), D. Miller, P. Liu and P. MacDaniel (PSU co-PIs);  
in collaboration with UC Davis, Purdue, ICSI, SRI and SPARTA  
Total PSU funding: \$270,000 in year 1; \$363,000 in each year 2 and 3  
Total EMIST funding: \$5,550,000.  
Associated project is the DETER national cyber security testbed: <http://www.lal.edu/deter>  
combined EMIST/DETER funding \$11,120,000.

Sept. 2003, VeriTest Inc. consulting contract on Internet measurement.

2003-2006 NSF ITR: Robust Ad Hoc Active Vision Networks and Applications.  
O. Camps (PI), G. Kesidis and M. Sznaier (co-PIs).  
Funding: \$360,000

2003-2004 DARPA/ONR MURI on Emerging Surveillance Plexus (ESP), S. Phoha (PI), G. Kesidis (Senior Personnel)  
My sub-topic: Distributed mobility and energy management  
Funding: \$18k per year

2002-2003 Cisco Systems Ltd URP (gift): Diagnostics and real-time traceback of distributed denial of service (DDoS) attacks in the Internet.  
G. Kesidis (PI).  
Funding: \$53k

2002-2005 NSF ITR: Routing of dynamic service level agreements between interdomain bandwidth brokers.  
R. Acharya (PI), G. Kesidis and N. Gautam (co-PIs).  
Funding: \$448,920

Note: I was the sole investigator/consultant for all of the following:

2001 Reed-White, New York, NY.  
I was retained as an expert witness by this law firm to work on a patent dispute involving ATM technology.

1999-2000 MITACS Federal (Canada) Centre of Excellence Grant:  
Title: "Network Resource Partitioning"

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Funding: \$8,000 per year.

1999-2000 NSERC (Canada) Personal Operating Grant:

Title: "Admission Control and Resource Partitioning of Broadband Communication Networks"

Funding: \$22,050 per year.

July 1999 one-day tutorial for Stratum One (now Cisco).

Title: "Low-level traffic management in broadband networks"

1998-1999 Nortel Networks, Ottawa, research contract

Title: Traffic Scheduling in Flat Broadband Networks.

Funding from Nortel: \$30,000.

Oct. 1998 Spacebridge, Hull, contract

Five-day short course on ATM networking and ATM over satellite.

Funding: \$8500.

1998 Arnold, White and Durkee, Attorneys at Law, Chicago, IL.

I was retained as an expert witness by this law firm for a patent dispute involving ATM technology.

1997 Newbridge Networks Corp. (now Alcatel) consulting contract:

Title: "Transmission of MPEG Video over ATM Service Classes"

This project involved a presentation at the ATM Forum in May 1997.

Funding: \$8,000.

1996-1997 Nortel consulting contract (one year):

Title: "Virtual Path Management in ATM Networks"

Funding: \$15,000.

1996-1997 CYTR & ITRC (Canada):

Title: "Cell-Level Measurement" (G. Kesidis, co-investigator)

Project: "ABR Services Management & Cell-Level Congestion Control" (J. Mark, P.I.)

Major Project: "ATM Network Resources Management Architecture" (A. Leon-Garcia, leader).

1996-1998 NSERC Personal Operating Grant (3 year):

Title: "Cell-Level Resource Management and Simulation for ATM-based B-ISDNs"

Funding: \$18,350 per year.

1996-1998 B.N.R. (Nortel) consulting contract (one year):

Title: "Queue scheduling and control for support of multiple QoS requirements in ATM networks"

This contract was partially funded by URIF of Ontario.

Total Funding: \$30,000.

1993-1996 NSERC Personal Operating Grant (3 year):

Title: "Design and Control of Integrated, High-Speed Communication Networks"

Funding: \$20,400 per year.

Ph.D. Graduate Student Supervision:

student	dept	grad. date	thesis topic
A. Hung	EE&CE	'97	ATM scheduling, ATM over satellite
D. Fayek	EE&CE	'01	MPLS, routing, game theory (with A. Vannelli)
X. Deng	CSE	'04	active queue management (with C. Das)
S. Yi	CSE	Aug '05	active queue management (with C. Das)
S. Jiwassurat	CSE	Aug '05	scheduling
Y. Jin†	EE	Dec '05	Internet dynamics and economics
I. Hamadeh**†	CSE	May '06	network security, forensics
R. Rao**	EE	Aug '06	wireless sensor networks
P.B. Jeon**	EE	Aug '06	ad hoc networks (with T. La Porta)
B. Mortazavi*	CSE		peer-to-peer
H. Choi*	CSE		secure wireless networks (T. La Porta primary advisor)
A. Nalshaboori*	EE		wireless networks (with J. Doherty)
G. Cari*	EE		security
J. Wang	EE		pattern recognition (with D. Miller)
A. Das	EE		wireless networking
Y. Xia	EE		pattern recognition (with D. Miller)

\*passed PhD candidacy exam

\*\*passed PhD comprehensive exam and expected to graduate in '06

† OPT with Cisco in Fall '05

‡2002 AT&amp;T Wireless Fellowship recipient, successfully defended PhD thesis, graduating Dec. 2005.

PhD student summary: 5 graduated, one graduating Dec. 2005, three graduating in 2006, and 7 others in progress.

Current M.S. Graduate Student Supervision:

student	dept	grad. date	thesis topic
P. Das	EE	'06	
B. Madabusi Vijayaraghavan	EE	'06	Solaris sensor networks (co-supervised)
J. Tomlinson	CSE		

MS student summary: 27 graduated and 3 in progress.

Honors Undergraduate Thesis Supervision:

I. Elash	EE	'04	network security
A.J. Wilson	CSE	Dec 05	peer-to-peer networking
M. Butt	CSE	'06	graphics

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Courses Taught:

I have taught undergraduate courses on:

- state-space linear systems (senior)
- probability and statistics (junior)
- electrical circuits (freshman and sophomores)
- signals and systems: frequency domain methods (juniors), at PSU: EE 350 and EE 317
- communication networks (seniors), at PSU: CSE/EE 458
- security of communication networks, at PSU: CSE 497

I have taught graduate courses on:

- queuing networks
- stochastic processes
- optimization
- estimation and detection, at PSU: EE 562
- introduction to communication and computer networks, at PSU: CSE 514
- performance evaluation for communication networks, at PSU: CSE/EE 597
- security of communication networks, at PSU: EE 598

Service:*Professional/Research Community:*

- Technical Program Committee (TPC) co-chair for INFOCOM 2007.
- TPC co-chair of first Workshop on Secure Network Protocols (NPSec) held in conjunction with IEEE ICNP 2006.
- Assoc. editor for International Journal of Security and Networks, 2005-.
- TPC vice-chair for Advances for Networks and Internet Symposium, IEEE GLOBECOM 2005, St. Louis.
- Co-editor of IEEE JSAC 2005 special issue on price-based access control and economics for communication networks.
- TPC member of the following conferences: ETRICS (Freiburg), IEEE WiOpt 2006 (Boston), IEEE/ACM MASCOTS 2005 (Atlanta), Co-Next 2005 (Toulouse), 2005 Wireless Networks and Optimization Conf. (Trento, Italy), Global Internet 2005 (Miami).
- awards committee member for IEEE INFOCOM'05.
- Organizer of the Workshop on Economics of Communication Networks, as part of the Stochastic Networks Conference in Montreal, July 2004.
- Assoc. editor of the Computer Networks (COMNET) journal in 2000-2003.
- Member of the TPC of: IADS'06; 2003 Sensor Networks Workshop (SNPA'03, part of ICC'03); IEEE INFOCOM '03-'06, '02 (also tutorials co-chair), '01 (team leader for differentiated services category), '99, '98 (area co-ordinator) and '94; IEEE GLOBECOM and IEEE ICC for the past five years.
- Co-chair of the 9th biannual IEEE Workshop on Computer-Aided Modeling Analysis and Design 2002 (CAMAD'02) held in New York City, May 2, 2002, in conjunction with IEEE ICC'02.
- I was the TPC co-chair of the 1998 Canadian Conference of Electrical and Computer Engineering (CCECE) held in Waterloo in May 1998.
- I co-edited a special issue of IEEE Communications Magazine on the subject of Broadband over Satellite (July 1997 issue).
- I have refereed many papers for IEEE and ACM sponsored journals and conferences.
- I have reviewed many NSF and NSERC (of Canada) grant proposals and have served on several NSF panels.

*University Community:*

- CSE laboratory committee, 2005-.
- Consulted with PSU's ITS on anonymization of Internet traffic traces.
- College of Engineering academic computing committee (CoE ACC) S'05-.
- EE dept graduate committee, F'03-present.
- EE dept advisory committee, F'03-S'04.
- Co-ordinator of EE 560 PhD candidacy exam, 2002-2004.
- EE Computer Networking and Infrastructure Committee, 2003.

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- CSE awards committee, 2003.
  - Vice-chairman of central PA chapter of the IEEE, 2003-2004.
  - EE faculty development (hiring) committee, 2002-2003.
  - Penn State's PDG technical advisory board (TAB) representative, 08/02-12/02.
  - Member of Penn State's inter-college Operations Research faculty, 2002-present.
  - Chair of EE's Computer Engineering Task Force, 2001-2002.
  - member of many individual PhD candidacy, PhD comprehensive, and PhD and masters defense committees in EE and CSE.

# **EXHIBIT**

## **B**

**REDACTED**



# **EXHIBIT**

# **C**

**REDACTED**

# **EXHIBIT**

# **D**

# The 2nd US - Japan Experts Workshop on Critical Information Infrastructure Protection (CIIP)

June 26-27, 2005

## Pictures from the workshop

Hotel Tokyo Garden Palace, Ochanomizu, Tokyo

Sponsored by:

National Science Foundation (NSF),

U.S. Department of Homeland Security (DHS),

Japan Science and Technology Agency (JST),

Ministry of Education, Culture, Sports, Science and Technology (MEXT)



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Security



JAPAN SCIENCE AND TECHNOLOGY AGENCY

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Ministry of Education, Culture, Sports, Science and Technology

6/26	8:30-9:00	Registration
	9:00	Welcome Presentation JST welcome: Yukio Sato, JST Opening Remarks(Japan): Norihisa Doi, Chuo University Opening Remarks(US): Rebecca Wright, Stevens Institute of Technology
	9:30	Plenary Session (chair: Norihisa DOI) (1) Current status on CIIP research in Japan Suguru Yamaguchi, Nara Institute of Science and Technology (2) Current status on CIIP research in USA Carl Landwehr, NSF
	10:30-10:40	Break
		Session 1: Protection on Information Infrastructure (chair: Rebecca Wright) (1) Progress on Monitoring incident information and analysis technology Koji Nakao, National Institute of Information and Communications Techir (2) Evaluation Methods for Internet Security Technology (EMIST)

10:40	<p>George Kesidis, Penn State University</p> <p>(3) Privacy Preserving Revocation Check in PKI Hiroaki Kikuchi, Tokai University</p> <p>(4) Breaking Vulnerability Monocultures with Synthetic Diversity Jeff Rowe, University of California at Davis</p> <p>(5) Application Communities: Using Monoculture for Dependability Angelos Keromytis, Columbia University</p>
12:45-14:00	Lunch
14:00	<p>Session 2: Protection on Information and Data (chair: Rick Schlichting)</p> <p>(1) Privacy in Cryptography Eiji Okamoto, University of Tsukuba</p> <p>(2) Progress on the PORTIA Project in Privacy-Preserving Data Mining Rebecca Wright, Stevens Institute of Technology</p> <p>(3) Progress in Research on Trust and Anshin (Assurance) Yuko Murayama, Iwate Prefectural University</p> <p>(4) Practical Language-Based Security, from the Ground Up Michael Franz, University of California at Irvine</p>
15:40-15:50	Break
15:50	<p>(5) Difficulty of Government PKI Implementation (Japan's case) Hiromitsu Takagi, National Institute of Advanced Industrial Science and</p> <p>(6) Secret Locking: A New Approach to Biometric Key Encapsulation Susanne Wetzel, Stevens Institute of Technology</p> <p>(7) Making Chord Robust to Byzantine Faults Jared Sala, University of New Mexico</p>
17:05-18:20	Break & Poster Session
18:30-20:00	Reception

6/27	<p>Session 3: Multidisciplinary CIIP (chair: Eiji Okamoto)</p> <p>(1) Trial Development of "Multi-Risk Communicator (MRC)" and Its Application to C Ryoichi Sasaki, Tokyo Denki University</p> <p>(2) ForNet: A Distributed Forensic Network Nasir Memon, Polytechnic University</p> <p>(3) Critical Infrastructure Security through Provably Secure Mediation Patrick McDaniel, Penn State University</p>
9:00	

	(4) Overarching System Security: Information Security Optimization through Techn and User Characteristics Coordination Masakatsu Nishigaki, Shizuoka University
	(5) Quantifying Information Security Risks Using Expert Opinion Elicitation Julie Ryan, George Washington University
11:05	Closing Remarks
11:20	Adjourn

## Past US-Japan CIIP Workshop

- First US - Japan CIIP Workshop

updated: August 22, 2005